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Transmitted herewith for filing is the Utility Design Plant patent application of:Inventor(s) Ronald S. Deichmann
Robert L. KuykendalJ6551 U.S. PTO
09/173423
10/15/98

Title of invention: LIQUID CANNON WITH TRUNNTON ASSEMBLY

Enclosed are the following items:

A. Duplicate copies of this Patent Application Transmittal Form.

B. 6 Sheet(s) of informal formal drawings.

C. 13 Page(s) of specification.

D. 10 Page(s) of claims.

E. 21 Page(s) of abstract.

F. Declaration (Signed) X (Unsigned) _____

G. A Power of Attorney executed by the Inventor(s) Assignee.

H. An assignment transmittal letter

I. A verified statement to establish Small Entity status under 37 CFR 1.9 and 37 CFR 1.27

J. An Information Disclosure Statement.

K. A list of references (Form PTO-1449)

L. Copies of references

M. Preliminary Amendment

N. Postcard

O. Other (specify) _____

CLAIMS AS FILED

BASIC FILING FEE:	SMALL ENTITY		OTHER THAN SMALL ENTITY	
	<input checked="" type="checkbox"/> Utility	\$395	or	\$395
<input type="checkbox"/> Design	\$145	or	\$290	\$ _____
<input type="checkbox"/> Plant	\$260	or	\$480	\$ _____
TOTAL CLAIMS <u>50</u> - 20 = <u>30</u> x <u>\$11</u>	\$330	x	\$22	= \$330
INDEPENDENT CLAIMS <u>3</u> - 3 = <u>0</u> x <u>\$37</u>		or	x \$74	= \$0
MULTIPLE DEPENDENT CLAIMS PRESENT	+ \$115	or	+ \$230	= \$ _____
RECORDING FEE FOR ASSIGNMENT (\$40.00)				\$ _____
TOTAL FILING FEE:				\$ 725

VERIFIED STATEMENT CLAIMING SMALL ENTITY STATUS
(37 CFR 1.9(d) & 1.27(b))--INDEPENDENT INVENTORDocket Number (Optional)
WW-8Applicant or Patentee: Ronald S. Deichmann & Robert L. KuykendalApplication or Patent No. Doc No. WW-8 attachedFiled or Issued attachedTitle. Liquid Cannon With Trunnion Assembly

As a below named inventor, I hereby declare that I qualify as an independent inventor as defined in 37 CFR 1.9(c) for purposes of paying reduced fees to the Patent and Trademark Office described in.

the specification filed herewith with title as listed above.
 the application identified above
 the patent identified above.

I have not assigned, granted, conveyed or licensed and am under no obligation under contract or law to assign, grant, convey or license, any rights in the invention to any person who would not qualify as an independent inventor under 37 CFR 1.9(c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

Each person, concern or organization to which I have assigned, granted, conveyed, or licensed or am under an obligation under contract or law to assign, grant, convey, or license any rights in the invention is listed below:

No such person, concern, or organization exists.
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Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27)

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

Ronald S. Deichmann
NAME OF INVENTOR

Signature of Inventor

30PT 11-98

Date

Robert L. Kuykendal
NAME OF INVENTOR

Signature of Inventor

11 SEPTEMBER 1998

Date

NAME OF INVENTOR

Signature of Inventor

Date

Doc. No. WW-8

United States Patent Application

Title: LIQUID CANNON HAVING TRUNNION ASSEMBLY

Inventors: Ronald S. Deichmann and Robert L. Kuykendal

CONFIDENTIAL DOCUMENT CONTAINING PROPRIETARY INFORMATION

I FIELD OF INVENTION

This invention relates to a Water Cannon for directing a stream of liquid at a selected direction and inclination for a selected duration, and to a unique trunnion for varying the direction and inclination of a water or other type cannon.

II BACKGROUND OF THE INVENTION

U.S. Patents 5,160,086 and 5,641,120 disclose methods and apparatus for forming a lighted laminar flow fluid stream.

However, neither of these references disclose means for varying the direction, inclination or duration of the fluid stream.

U.S. Patents 1,526,341; 2,759,731; 3,342,492; 3,362,713 disclose water pistols and cannons used as amusement devices. But these references do not involve trunnion support.

U.S. Patent 4,905,900 discloses a method and apparatus for cleaning an air conditioner with a water cannon having an air gun therein for explosively discharging a quantity of water to dislodge sludge in the air conditioner. But it is not supported on a trunnion.

U.S. Patent 4,085,256 discloses a water cannon mounted a vehicle such as an armored car with a trunnion for controlling crowds of unruly people. But this device is not at all for amusement, and does not disclose the trunnion

stops to prevent undue horizontal and vertical azimuth bearing of the cannon.

U.S. Patent 4,338,852 discloses a trunnion having stops to control vertical azimuth bearing of a gun and a torsion bumper stop for absorbing shock loads as the gun nears the limits of its upward and downward motion. but this not a water cannon or an amusement device.

III SUMMARY OF THE INVENTION

A. OBJECTS OF THE INVENTION

One object of the present invention is to provide a trunnion for varying the direction and inclination of apparatus for launching a fluid or solid.

Another object of the present invention is to provide a method and apparatus for launching a fluid stream at a selected direction and inclination.

Another object of the present invention is to provide a method and apparatus for varying the duration of the fluid stream.

Another object is to provide a water cannon amusement device.

Another object is to provide means for varying the extent of horizontal variation permitted.

Another object is to provide resilient stop means for varying the the horizontal inclination of the device.

Another object is to provide means for varying the extent of vertical variation permitted.

Another object is to provide resilient stop means for varying the the vertical inclination of the device.

Other objects will be apparent the following Description and Drawings.

100-200-300-400-500-600-700-800-900

B. SUMMARY

In accordance with the present invention a trunnion assembly is provided for mounting a launching device including a horizontal locating assembly 10 to provide for selected horizontal movement of the the launching device and a vertical locating assembly 80 for varying the inclination of the launching device.

In one embodiment the launching device includes an accumulator tank 24 located below the locating assemblies 10, 80, which receives a liquid such as water. A valve assembly 30 including solenoid valve 32 is in fluid communication with the accumulator 24. Valve assembly 30 may be electrically or pneumatically controlled by a controller 34.

A stantion assembly 40 includes a curved stand 42 having a vertical portion 43, a curved portion 44 and a horizontal portion 45. Vertical portion 43 includes a lower end 44 which extends into a bearing assembly 50 including a cylindrical enclosure 51 which receives cylindrical bearing 52 made of known composite bearing material, and is connected to stand end portion 44 with removable fastening means 53 such as bolt 54. Bearing 52 is movable with respect to enclosure 51 and mounting plate 55 to which is integrally connected as by welding.

A flexible conduit means 60 includes a first fluid containing conduit 61. A second flexible electrical conduit 62 carrying wires 63, and first conduit 61 are fed into

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stacion end portion 44 and through stand 42 and extend through stand horizontal portion 45 and into a barrel assembly including a cylindrical barrel 71 through cylindrical barrel extension 72.

Pattern openings 14 are provided in base plate 55 to receive stop assemblies 20 including stop plates 21 having openings 22 to receive fasteners 23. Stops 24 are mounted vertically on stop plates 21. Resilient bumpers 25 made of elastomeric material having a Durometer value of about 60 to 100 A Scale are mounted on stops 24 with fasteners 26 which extend through respective openings 27 and 28, 28a in stops 24 and part way through bumpers 25. As shown in Figure the fastener 29 may be formed interal with the bumpers, or the opening 28a may be threaded to receive threaded fastener 26. Thus the extent of horizontal rotation can be varied through varied placement of stop assemblies 20 into openings 14.

The inclination stop assembly 80 fits within stand horizontal portion 45 and barrel extension 72 and as shown in Figures 3-6 includes a cylindrical casing 81 extending into horizontal stand portion having elongated opening therein 81a to receive set screws 87. The extent of the elongation of openings 81a allows limited adjustability of the extent of vertical travel of the barrel 71. Located within casing 81 is a sleeve 82 having openings 82a to also receive set scres 87, which fix the location of sleeve 82. A pair cylindrical dogs 83 and 85 each having cutaway portions

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83b and 85b are located within casing 81 and are movable on shaft 86a extending from base 86, having a head 86b located within barrel extension 72 and includes openings 86c to receive set screws 87 which render the shaft 86a movable with barrel 71 about the horizontal A-A in Figure 1.

Located within respective cutaway portion 83b and 85b are semi-cylindrical floating stops 84 and 84S made of elastomeric reilient material such as polyurethane having a Durometer value of 60 to 100 A Scale. As shown if Figure 5 clearance 84C exists between floating stop 84 and dog 85. Similar clearance exists between floating stop 84 and dog 83.

This Flexible conduit 62 containing wires 63 extends through barrel 71 to a first end 73 to a light assembly 90 to light the liquid carried through flexible conduit 61 and discharged from the second end of the barrel, which houses an orifice assembly 100. The light assembly 90 includes and electrical switch 91, a light bulb 92, and an activating botton 93 held in place within barrel end portion 73 by end cap 74. At the other end an orifice assembly 100 includes an orifice 105 which may have a knife edge 106. Optionally diffuser material 107 may be included to lower the Reynolds number of the liquid to create laminar flow.

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IV THE DRAWINGS

Figure 1 is a schematic view of the trunnion and water cannon apparatus of the present invention.

Figure 2 is a bottom perspective view of the horizontal location assembly of the present invention.

Figure 2A is a bottom view of the horizontal location assembly and the mounting plate of the present invention.

Figure 2B is a perspective view of the horizontal location assembly of the present invention.

Figure 2C is a perspective view of the horizontal location bumper of the present invention.

Figure 2D is a view looking in the direction of the arrows along the line 2D-2D in Figure 2C.

Figure 2E is a perspective view of another embodiment of the horizontal location bumper of the present invention.

Figure 2F is a view looking in the direction of the arrows 2D-2D along the line 2F-2F in Figure 2E.

Figure 2G is a perspective view of the vertical location assembly of the present invention.

Figure 3 is a top plan view of the vertical location assembly of the present invention.

Figure 4 is an elevation view of the vertical location assembly of the present invention.

Figure 5 is a schematic perspective view of the vertical location assembly of the present invention.

Figure 6 is an exploded view of the vertical location stop assembly of the present invention.

V DESCRIPTION OF PREFERRED EMBODIMENTS

In accordance with the present invention a trunnion is provided for mounting a launching device including a horizontal stop assembly 10 to provide for selected horizontal movement of the the launching device and an inclination stop assembly 80 for varying the inclination of the launching device.

In one embodiment the launching device includes an accumulator tank 24 located below the first and second stop assemblies which receives a liquid such as water through an adapter 25 to allow for various size supply hoses.

A valve assembly 30 including for example a solenoid valve 32 is in fluid communication with the accumulator 24. Valve assembly 30 may be electrically or pnuematically controlled by a controller 34. A second on and off valve 33 is provided which may be manually operated. Valve 32 is provided to control air pressure in the tank which may be electrically or pnuematically controlled.

A stantion assembly 40 includes a curved stand 42 having a vertical portion 43, a curved portion 44 and a horizontal portion 45. Vertical portion 43 includes a lower end 44 which extends into a bearing assembly 50 including a cylindrical enclosure 51 which receives cylindrical bearing 52 made of known composite bearing material, and is connected to stand end portion 44 with removable fastening means 53 such as bolt 54. Bearing 52 is

movable with respect to enclosure 51 and mounting plate 55 to which is integrally connected as by welding.

End portion 44 extends below mounting plate 55. The first stop assembly 10 is mounted on the bottom of base plate 55, and a cylindrical stop ring 11 having an extension stop 12 integrally connected thereto as by welding is mounted on portion 44 with removable fasteners 13.

Pattern openings 14 are provided in base plate 55 to receive stop assemblies 20 including stop plates 21 having openings 22 to receive fasteners 23. Stops 24 are mounted vertically on stop plates 21. Resilient bumpers 25 made of elastomeric material having a Durometer value of about 60 to 100 A. Scale are mounted on stops 24 with fasteners 26 which extend through respective openings 27 and 28, 28a in stops 24 and part way through bumpers 25. As shown in Figure the fastener 29 may be formed integral with the bumpers, or the opening 28a may be threaded to receive threaded fastener 26. Thus the extent of horizontal rotation can be varied through varied placement of stop assemblies 20 into openings 14 in base plate 55.

Valve assembly 30 includes a pipe fitting 31 to which is connected a flexible conduit means 60 including a first fluid containing conduit 61. A second flexible electrical conduit 62 carrying wires 63 and first conduit 61 are fed into stancion end portion 44 and through stand 42 and extend through stand horizontal portion 45 and into a barrel assembly including a cylindrical barrel 71 through

cylindrical barrel extension 72 integrally connected to barrel 72 for example by welding.

Flexible conduit 62 containing wires 63 extends through barrel 71 to a first end 73 to a light assembly 90 to light the liquid carried through flexible conduit 61 and discharged from the second end 75 of the barrel, which houses an orifice assembly 100.

The light assembly 90 includes an electrical switch 91 connected to wires 63, a light bulb 92, and an activating button held in place within barrel end portion 73 by end cap 74, held in place with removable fasteners 96. At the other end the orifice assembly 100 includes a pipe fitting 101 which engages conduit 61 which is held in place with a front cover 102 with removable fastening means 103. A trim piece 104 holds in place an orifice 105 which may have a knife edge 106. Optionally diffuser material 107 may be included to lower the Reynolds number of the liquid to create laminar flow.

The barrel includes means 110 for moving the launching device both vertically and horizontally, for example handles 112.

The accumulator 10 is in fluid communication with the second end 75 of the barrel through conduit 61. Water or other liquid is supplied to the accumulator 24 through the hose 26 and adapter 25.

The first valve means 30 is in fluid communication with the accumulator 24 which is electrically or pneumatically

controlled by controller 34 acting through wires 63 in conduits 62 extending to button 93 in light assembly 90. The light assembly 90 for activating liquid discharge is located adjacent handles 28. The duration of the time required to refill accumulator 24 may be controlled with controller 34 with an electrical connection to a supply pump 27 having graduated pump speeds to vary the accumulator refill time.

The inclination stop assembly 80 fits within stand horizontal portion 45 and barrel extension 72 and as shown in Figures 3-6 includes a cylindrical casing 81 extending into horizontal stand portion having elongated opening therein 81a to receive set screws 87. The extent of the elongation of openings 81a allows limited adjustability of the extent of vertical travel of the barrel 71. Located within casing 81 is a sleeve 82 having openings 82a to also receive set screws 87, which fix the location of sleeve 82. A pair cylindrical dogs 83 and 85 each having cutaway portions 83b and 85b are located within casing 81 and are movable on shaft 86a extending from base 86, having a head 86b located within barrel extension 72 and includes openings 86c to receive set screws 87 which render the shaft 86a movable with barrel 71 about the horizontal A-A in Figure 1.

Located within respective cutaway portion 83b and 85b are semi-cylindrical floating stops 84 and 84S made of elastomeric resilient material such as polyurethane having a Durometer of 60 to 100 A Scale. As shown in Fig. 5 clearance

84C exists between floating stop 84 and dog 85. similar clearance exists between floating stop 84 and dog 83. This clearance allows rotation by handles 112 of barrel 71 to the extent of the clearance between resilient stop 84 and dog 83 in one direction, and in the other direction between resilient stop 84s and dog 85. Limited variation in the extent of this clearance can be achieved by varing the location of set screws 87 in elongated slots 81a.

In operation, on and off valve 33 is first moved to the open position. Controller 34 is activated to fill accumulator tank 24 with liquid through hose 26 and adater 25. Air in the accumulator is compressed as the liquid enters tthe accumulator. A customer inserts a coin into the coin receiver 114, which activates the the electrical and/or pnuematic circuits for operation. The customer selects a target horizontally by using handles 112 to rotate stand portion 44 stop assemblies 20. The customer selects are vertical orientation by using handles 112 to rotate barrel 71 about axis A-A to the extent of clearance between resilient floating stops 84 and 84s relative to dogs 84 and 85. The customer then presses button 93 to activate solenoid valve 35 through wires 63 and controller 34. This causes fluid to flow from accumulator 34 through conduit 61 through stand 42, and then through barrel 71, through pipe filling 101 into orifice assembly 100 and out orifice 105. Under the control of controller 34, the liquid automatically is refiled into accumulator 24. The light bulb 92 signals when

the cycle has run and the customer may make another liquid blast.

The extent of horizontal rotation can be varied by moving stop assemblies to selected pattern openings 114. The extent of vertical rotation can be varied by varying the location of set screws 78 in elongated openings 81a.

The horizontal locating assembly 10 and the vertical locating assembly 80 of the barrel may be used to launch a crowd control liquid such as described in U.S. Patent 4,085,256; or a solid such as bullets or mortars, such as described in U.S. Patent 4,338,852. Each of these patents is hereby incorporated into the present application by this reference.

WHAT IS CLAIMED IS:

Claim 1.

A trunnion assembly for mounting a launching device comprising:

a barrel for launching a liquid or a solid;

a horizontal locating assembly to allow for limited horizontal movement of the the launching device; and a vertical locating assembly for varying the inclination of the launching device.

Claim 2. A trunnion assembly according to claim 1 including means for varying the extent of horizontel movement of said trunnion assembly.

Claim 3. A trunnion assembly according to claim 2 wherein said means for varying the extent of horizontel movement of said trunnion assembly comprise at least one movable stop assembly.

Claim 4. A trunnion assembly according to claim 3 wherein said means for varying the extent of vertical movement of said trunnion assembly comprise at least one stop assembly.

Claim 5. A trunnion assembly according to claim 4 wherein said means for varying the extent of horizontel movement of said trunnion assembly comprise at least one resilient movable stop assembly.

Claim 6. A trunnion assembly according to claim 5 wherein said means for varying the extent of vertical movement of said trunnion assembly comprise at least one resilient stop assembly.

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Claim 7. A trunnion assembly according to claim 6 wherein said means for varying the extent of horizontal movement of said trunnion assembly comprise at least a pair of resilient movable stop assemblies.

Claim 8. A trunnion assembly according to claim 7 wherein said means for varying the extent of vertical movement of said trunnion assembly comprise at least a pair of resilient stop assemblies.

Claim 9. A trunnion assembly according to claim 8 wherein said pair of resilient stop assemblies made of elastomeric material having an A Scale Durometer value of about 60 to 100.

Claim 10. A trunnion assembly according to claim 9 wherein said pair of resilient movable stop assemblies include stop plates and resilient bumpers.

Claim 11. A trunnion assembly according to claim 10 wherein said resilient bumpers are mounted on said stop plates. and

Claim 12. A trunnion assembly according to claim 11 wherein said resilient bumpers and said stop plates include openings to receive removable fasteners.

Claim 13. A trunnion assembly according to claim 12 wherein said fasteners are formed integral with said bumper. the

Claim 14. A trunnion assembly according to claim 12 wherein said resilient bumpers are threaded to receive said fastener.

Claim 15. A trunnion assembly according to claim 7 wherein said the extent of horizontal rotation can be varied through

selected placement of said stop assemblies on said base plate.

Claim 16. A trunnion assembly according to claim 5 wherein said means for varying the extent of vertical movement of said trunnion assembly comprise at least one resilient stop assembly located within a cylindrical casing.

Claim 17. A trunnion assembly according to claim 16 wherein said resilient stop assembly a pair cylindrical dogs, each having cutaway portions located within said casing and being movable on a shaft having a head located outside of said casing;

Claim 18. A trunnion assembly according to claim 17 wherein semi-cylindrical floating stops are located within respective cutaway portions such that clearance exists between said floating stops and said dogs.

Claim 19. A trunnion assembly according to claim 18 wherein said floating stops are made of elastomeric resilient material.

Claim 20. A trunnion assembly according to claim 19 wherein said elastomeric resilient material has a Durometer value of 60 to 100., A Scale.

Claim 21. A trunnion assembly according to claim 20 wherein said head is located within a barrel extension extending outwardly from said barrel and removable fastening means are provided to render said shaft movable with said barrel about a horizontal axis.

Claim 22. A trunnion assembly according to claim 21 wherein said resilient stop assembly extends within within a horizontal stand portion and said barrel extension.

Claim 23. A trunnion assembly according to claim 22 wherein a sleeve is located within said casing and means are provided to vary the extent of vertical movement about said horizontal axis.

Claim 24. A trunnion assembly according to claim 23 wherein said means to vary the extent of vertical movement about said horizontal axis comprises a sleeve having elongated openings to receive removable fasteners to allow limited adjustability of the extent of vertical travel of said barrel about said horizontal axis.

Claim 25.

A launching device comprising:
an accumulator located below a barrel assembly;
said barrel assembly mounted on a trunnion;
said barrel including means for launching a liquid or solid
substance;
said trunnion including a horizontal locating assembly to
allow for limited horizontal movement of the the launching
device; and a
vertical locating assembly for varying the inclination of
said barrel assembly;
said barrel assembly in fluid communication with said
accumulator;
conduit means for supplying liquid to said accumulator;
first valve means is in fluid communication with said
accumulator;
control means for controlling said first valve means;
to control opening and closing of siad first valve means,
and in open position allowing fluid to pass from said
accumulator into said barrel assembly, and to be discharged
from barrell assembly;

Claim 26. A launching device according to claim 25 wherein
said valve assembly includes a solenoid valve

Claim 27. A launching device according to claim 25 wherein
said valve assembly includes a second on and off valve.

Claim 28. A launching device according to claim 25 wherein
said launching device includes a stantion assembly including

a curved stand having a vertical portion, a curved portion and a horizontal portion.

Claim 29. A launching device according to claim 28 wherein said vertical portion includes a lower end which extends into a bearing assembly.

Claim 30. A launching device according to claim 29 wherein said bearing assembly includes a cylindrical enclosure which receives a cylindrical bearing which is connected to said end portion with removable fastening means.

Claim 31. A launching device according to claim 30 wherein said end portion 44 extends below a mounting plate.

Claim 32. A launching device according to claim 31 wherein horizontal locating assembly is mounted on said base plate.

Claim 33. A launching device according to claim 31 wherein said horizontal locating assembly includes lug means mounted on said end portion with removable fasteners.

Claim 34. A launching device according to claim 33 wherein said lug means includes a cylindrical stop ring having an outwardly extending lug integrally connected thereto.

Claim 35. A launching device according to claim 33 wherein said leg means engage stop assemblies to determine horizontal movement

Claim 36. A launching device according to claim 35 wherein said stop assemblies include horizontal stop plates upon which stops are mounted vertically.

Claim 37. A launching device according to claim 36 wherein resilient bumpers made of elastomeric are mounted on said stops.

Claim 38. A launching device according to claim 37 wherein said elastomeric material has a Durometer value of about 60 to 100, A Scale.

Claim 39. A launching device according to claim 37 wherein fasteners extend through openings in said stops, and through openings in said resilient bumpers.

Claim 40. A launching device according to claim 29 wherein said valve assembly is connected to a flexible conduit means including a first fluid containing conduit into stancion end portion, through said stand, through stand horizontal portion and into said barrel assembly.

Claim 41. A launching device according to claim 40 wherein second flexible conduit carrying electrical wires is also fed into said stancion end portion, through said stand, through said stand horizontal portion and into said barrel assembly.

Claim 43. A launching device according to claim 41 wherein said first flexible conduit extends through a barrel to a second end of the barrel, which houses a liquid orifice assembly.

Claim 44. A launching device according to claim 43 wherein said second flexible conduit extends through a barrel to a first barrel end to a light assembly to light the liquid

carried into said orifice assembly and is discharged therefrom.

Claim 45. A launching device according to claim 44 wherein said light assembly includes an electrical switch connected to said electrical wires, a light bulb, a lens and a discharge activating button.

Claim 46. A launching device according to claim 44 wherein said orifice assembly includes a discharge orifice.

Claim 47. A vertical locating assembly for varying the inclination of a launching device comprising:
at least one resilient stop assembly located within a cylindrical casing;
said resilient stop assembly including a pair cylindrical dogs, each having cutaway portions located within said casing and being movable on a shaft having a head located outside of said casing;
semi-cylindrical floating stops located within respective cutaway portions such that clearance exists between said floating stops and said dogs.

Claim 48. A vertical locating assembly according to claim 47 wherein said floating stops are made of elastomeric resilient material.

Claim 49. A vertical locating assembly according to claim 47 wherein said elastomeric resilient material has a Durometer value of about 60 to 100, A Scale.

Claim 49. A vertical locating assembly according to claim 48 wherein said head is located within a barrel extension extending outwardly from a launching barrel and removable fastening means are provided to render said shaft movable with said barrel about a horizontal axis.

Claim 50. A vertical locating assembly according to claim 49 wherein said resilient stop assembly extends within within a horizontal stand portion which supports said barrel.

ABSTRACT OF THE DISCLOSURE

A trunnion assembly is provided for mounting a launching device including a horizontal locating assembly 10 to provide for selected horizontal movement of the launching device and a vertical locating assembly 80 for varying the inclination of the launching device.

An accumulator tank 24 located below the locating assemblies 10, 80, which receives a liquid such as water. A valve assembly 30 including solenoid valve 32 is in fluid communication with the accumulator 24. Valve assembly 30 may be controlled by a controller 34.

A stantion assembly 40 includes a curved stand 42 having a vertical portion 43, a curved portion 44 and a horizontal portion 45. Vertical portion 43 includes a lower end 44 which extends into a bearing assembly 50 including a cylindrical enclosure 51 which receives cylindrical bearing 52 made of known composite bearing material, and is connected to stand end portion 44 with removable fastening means 53 such as bolt 54.

Pattern openings 14 are provided in base plate 55 to receive stop assemblies 20 including stop plates 21 having openings 22 to receive fasteners 23. Stops 24 are mounted vertically on stop plates 21. Resilient bumpers 25 made of elastomeric material having a Durometer value of about 60 to 100 A. Scale are mounted on stops 24 with fasteners 26 which extend through respective openings 27 and 28, 28a in stops 24 and part way through bumpers 25. Thus the extent of

horizontal rotation can be varied through varied placement of stop assemblies 20 into openings 14.

The inclination stop assembly 80 fits within stand horizontal portion 45 and barrel extension 72 and as shown in Figures 3-6 includes a cylindrical casing 81 extending into horizontal stand portion having elongated opening therein 81a to receive set screws 87. The extent of the elongation of openings 81a allows limited adjustability of the extent of vertical travel of the barrel 71. Located within casing 81 is a sleeve 82 having openings 82a to also receive set screws 87, which fix the location of sleeve 82. A pair cylindrical dogs 83 and 85 each having cutaway portions 83b and 85b are located within casing 81 and are movable on shaft 86a extending from base 86.

Flexible conduit 62 containing wires 63 extends through barrel 71 to a first end 73 to a light assembly 90 to light the liquid carried through flexible conduit 61 and discharged from the second end 75 of the barrel, which houses an orifice assembly 100.

The light assembly 90 includes an electrical switch 91 connected to wires 63, a light bulb 92, and an activating button held in place within barrel end portion 73 by end cap 74, held in place with removable fasteners 96. At the other end The orifice assembly 100 includes a pipe filling 101 which engages conduit 61 which is held in place with a front cover 102 with removable fastening means 103.

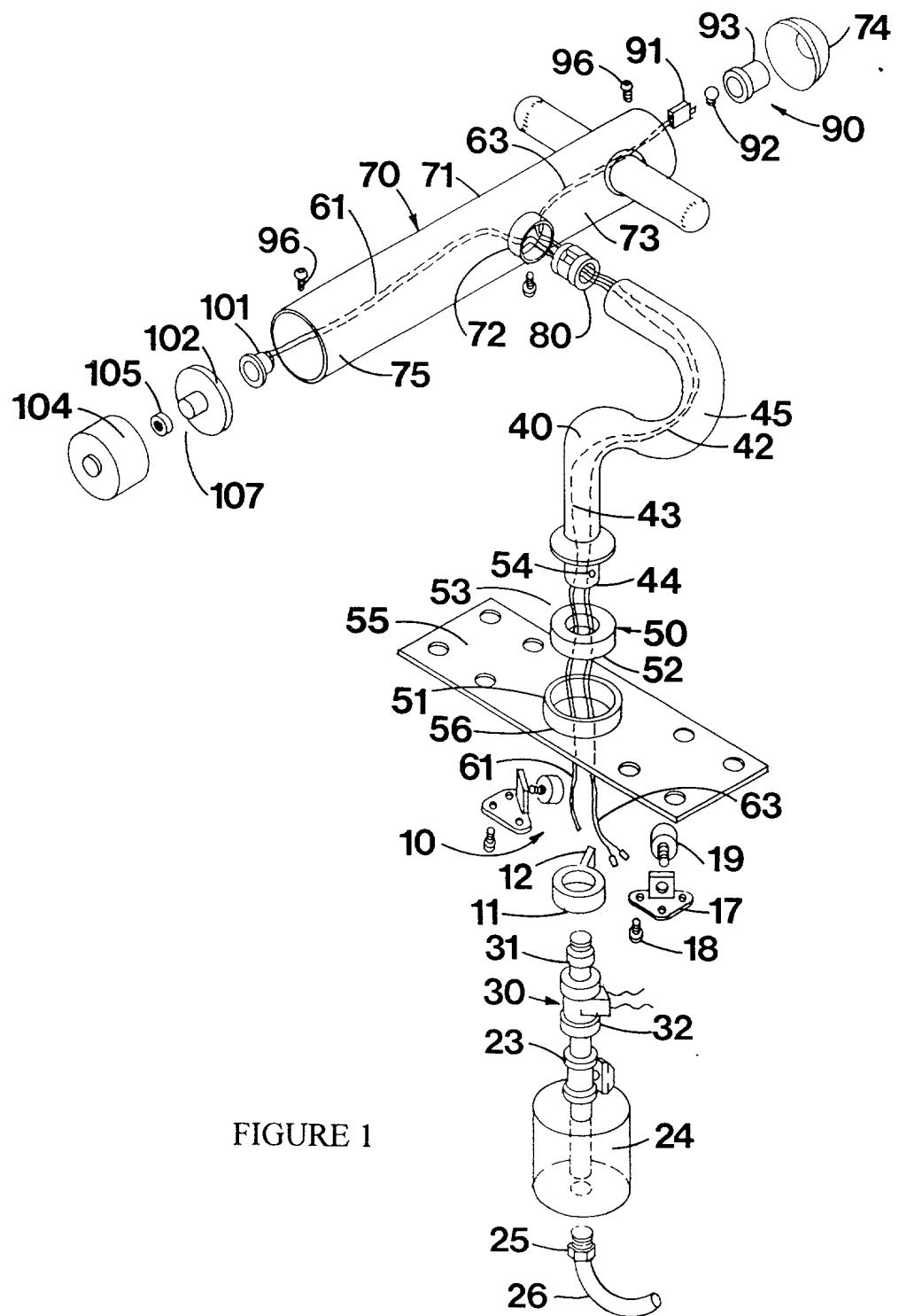


FIGURE 1

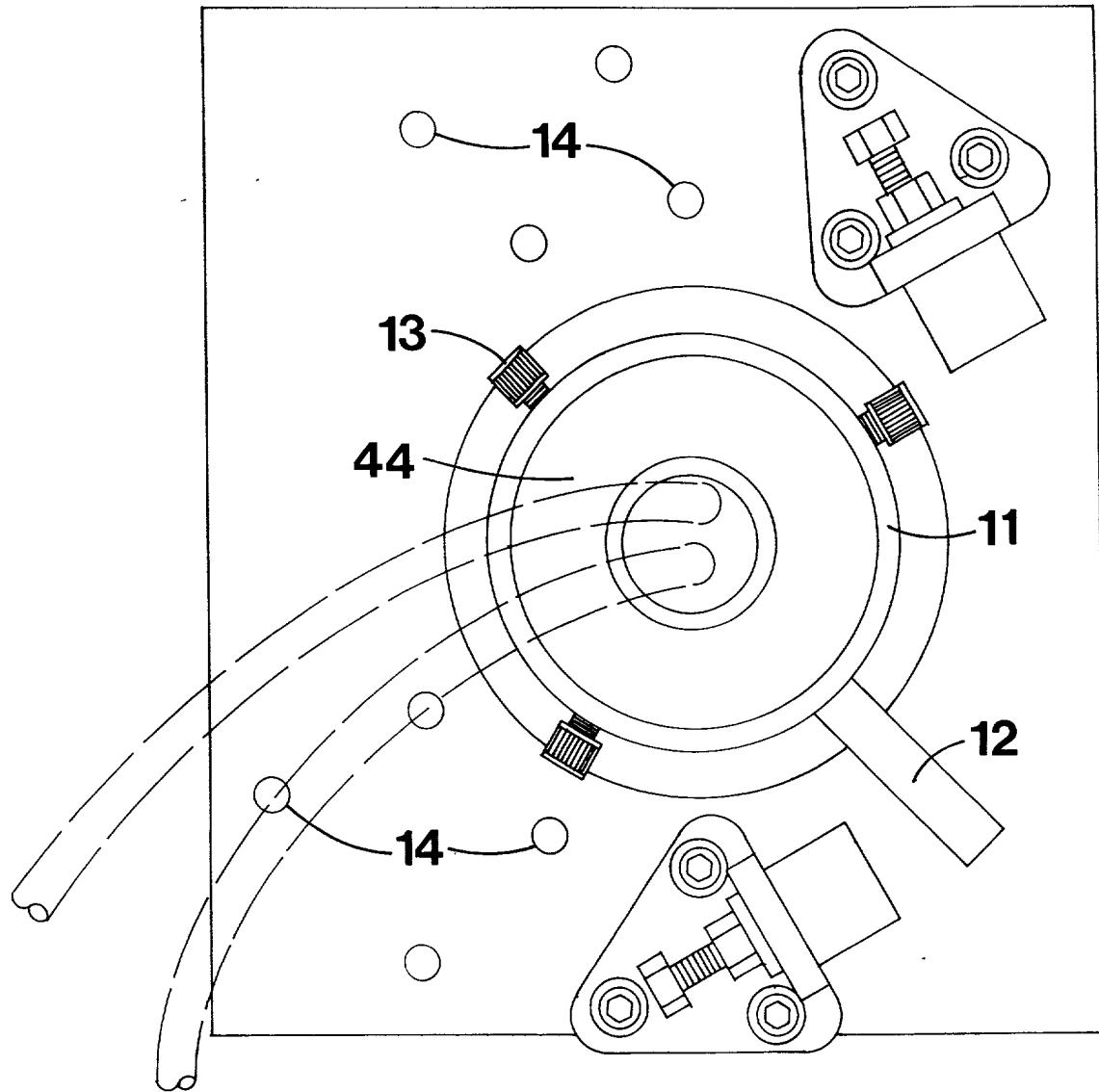
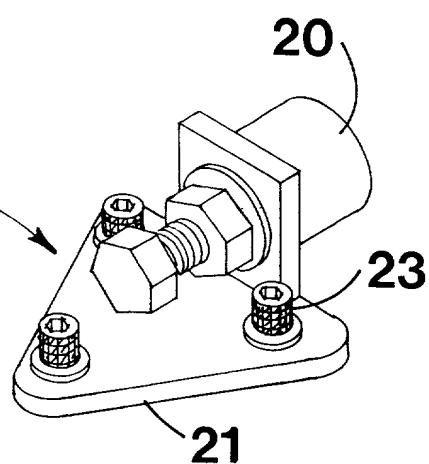
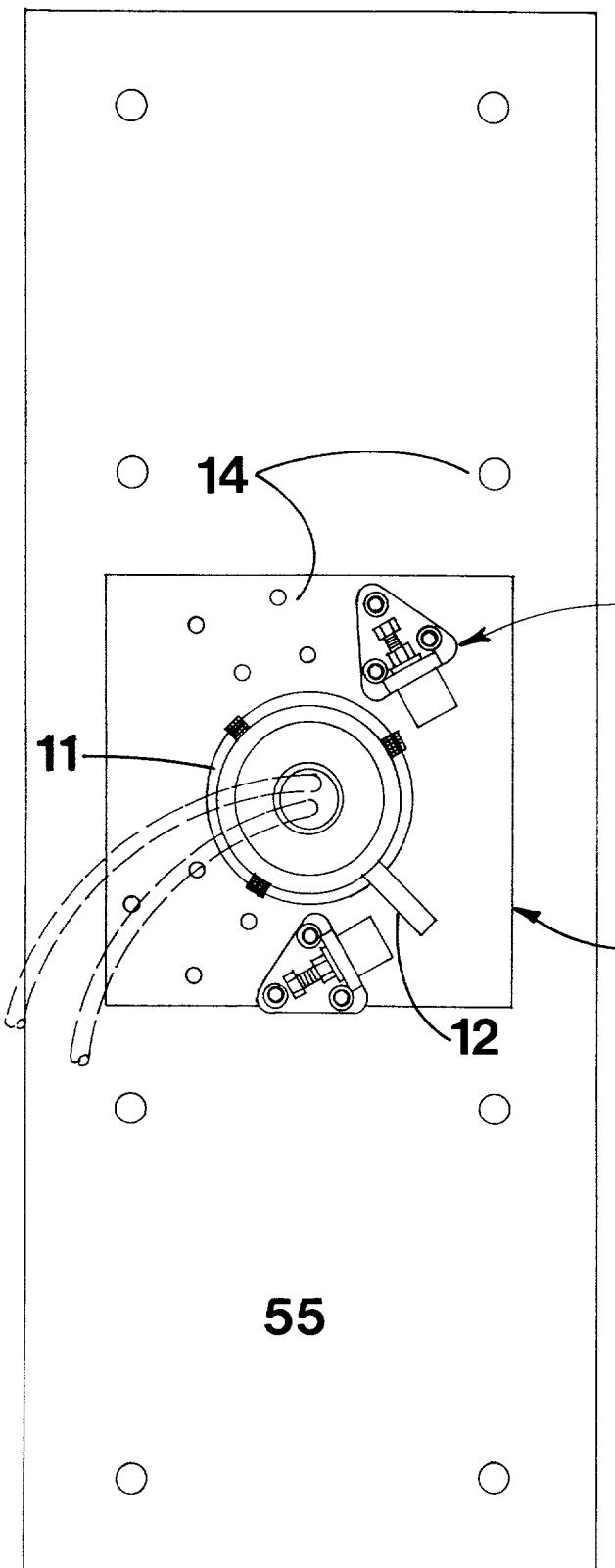


FIGURE 2



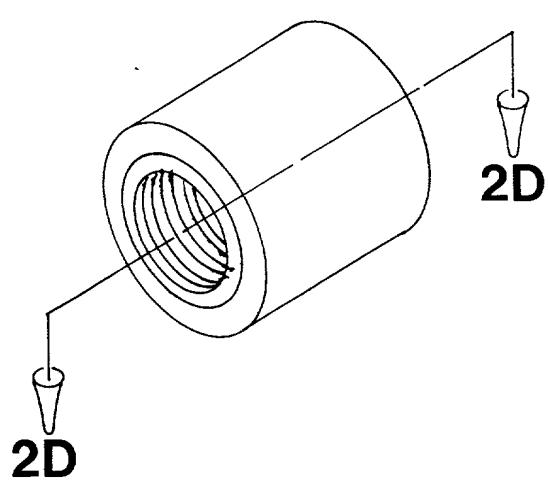


FIGURE 2C

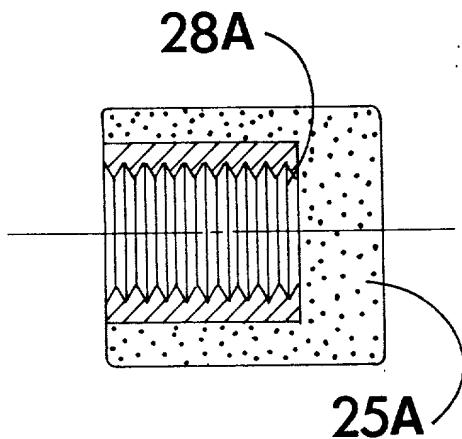


FIGURE 2D

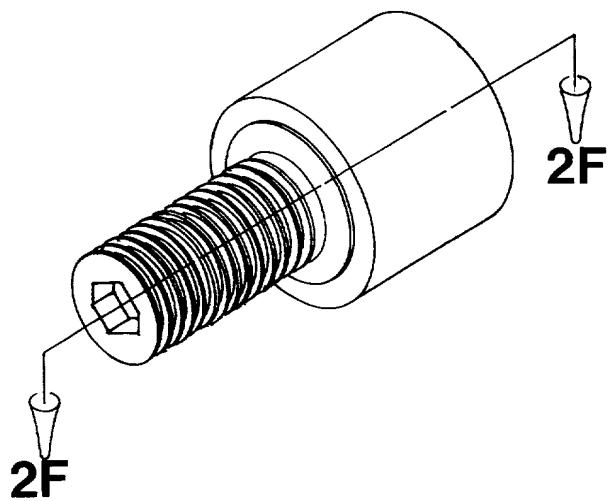


FIGURE 2E

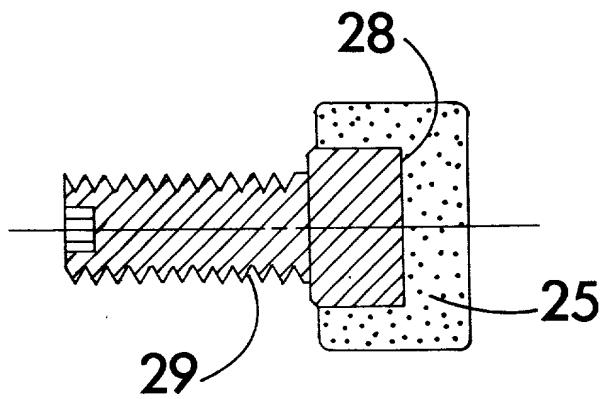


FIGURE 2F

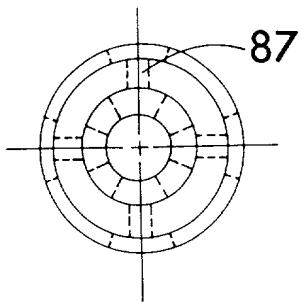


FIGURE 3

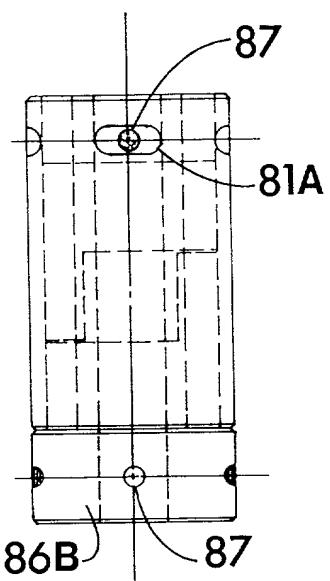


FIGURE 4

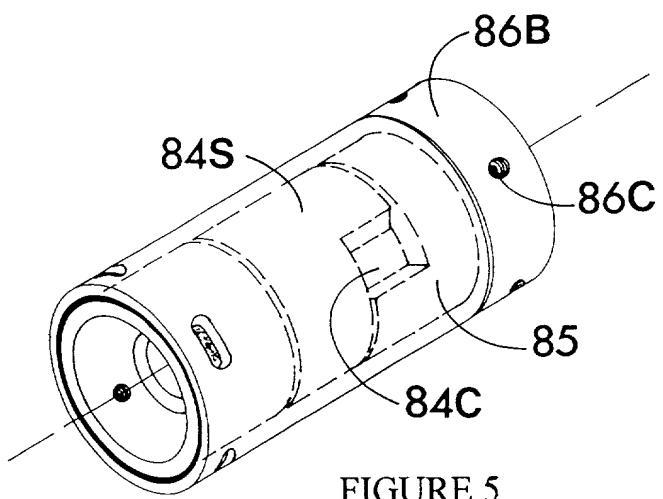


FIGURE 5

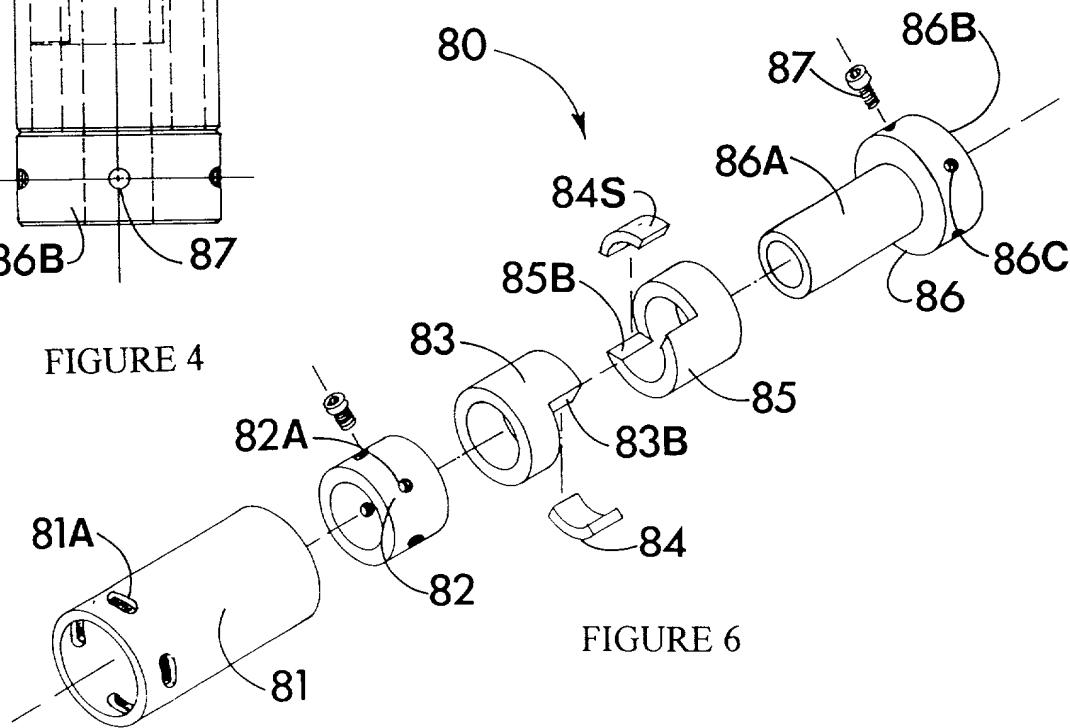


FIGURE 6

DECLARATION FOR PATENT APPLICATION

Docket Number

WW-8

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled Liquid Cannon with Trunnion Assembly, the specification for which is attached hereto unless the following box is checked:

was filed on _____ as United States Application Number or PCT International Application
Number _____ and was amended on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, § 119 of any foreign application (s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

Prior Foreign Application (s) None

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application (s) listed below and insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application. None

I hereby appoint the following attorney(s) and /or agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith: Henry W. Cummings
Address all telephone calls to Henry W. Cummings ant telephone number 314-949-9408
Address all correspondence to Henry W. Cummings, 3313 W. Adams St., St. Charles, MO 63301

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the such willful false statements may jeopardize the validity of the application or any patent issued thereon.

(Full name of sole or first inventor) Ronald S. Deichmann

Inventor's signature

Date SEPT 23, 98

Residence 4997 Dover Lane, House Springs Mo., 63051 Citizenship USA

Post office address 1136 Washington, St. Louis, Mo. 63101, Waterworks Int'l. Corp.

Full name of second joint inventor, if any (given name, family name) Robert L. Kuykendal

Second inventor's signature

Date 23 SEPTEMBER 1998

Residence 6620 San Bonita, St. Louis, Mo. 63105 Citizenship USA

Post office address Waterworks Intl. Corp., 1136 Washington, St. Louis, Mo. 63101

DÉCLARATION FOR PATENT APPLICATION

Docket Number
WW-8

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled Liquid Cannon with Trunnion Assembly, the specification for which is attached hereto unless the following box is checked:

was filed on _____ as United States Application Number or PCT International Application Number _____ and was amended on _____ (if applicable).

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Prior Foreign Application (s) None

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(Full name of sole or first inventor) Ronald S. Deichmann

Inventor's signature

Date SEPT 23, 98

Residence 4997 Dover Lane, House Springs Mo., 63051 Citizenship USA

Post office address 1136 Washington, St. Louis, Mo. 63101, Waterworks Int'l. Corp.

Full name of second joint inventor, if any (given name, family name) Robert L Kuvkendal

Second inventor's signature

Date 23 SEPTEMBER 1998

Residence 6620 San Bonita, St. Louis, Mo. 63105 Citizenship USA

Post office address Waterworks Int'l. Corp., 1136 Washington, St. Louis, Mo. 63101